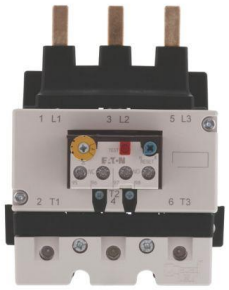
Powering Business Worldwide	**Product Environmental Profile**	PEP ecopassport®



ZB150 Overload relay

Representative product	ZB150-150 (278466) Product Category: Other Equipment (Passive product – Non-Continuous Operation)
Description of the product	Eaton Moeller® Series offers a robust solution for motor protection with its ZB150-150 Thermal Overload Relay. The ZB150-150 relay is designed to safeguard motors operating within a current range of 35A to 175A. It features bimetallic overload protection and is equipped with one normally open (N/O) and one normally closed (N/C) contact configuration. Some relay is intended for direct mounting, making it compatible with Eaton's DILM contactors, and it comes with an IP00 protection rating, ensuring safe handling and installation. The ZB150 relay is ideal for industrial applications requiring reliable thermal overload protection, and it complies with international standards for motor protection. The representative product selected for this study is Eaton Moeller® Series ZB150 Thermal Overload Relay with a current rating range of 120 A to 150 A.
Homogeneous Product Family	PEP covers the following part numbers under homogenous family

278472	ZB150-150/KK
107316	ZB150-175
107317	ZB150-175/KK
278461	ZB150-35
278467	ZB150-35/KK
278462	ZB150-50
278468	ZB150-50/KK
278463	ZB150-70
278469	ZB150-70/KK
278464	ZB150-100
278470	ZB150-100/KK
278465	ZB150-125
278471	ZB150-125/KK

Functional unit	"Protection of an electric motor against overload and phase failure in an industrial application, for a rated current range of 120-150 A, at a voltage up to 1000 V AC, over a reference service life of 20 years".

Company information	Eaton Industries GmbH Schemmener Str. 30, Gummersbach, Germany, 51647 Email: productstewardship-es@eaton.com

Constituent Materials of Reference Product:	1.47E+00 kg (With Packaging)		
Materials	**Category PEP Material**	**Mass (kg)**	**Percentage (%)**
Metals	Copper	4.30E-01	29.3%
Others	Cardboard	2.13E-01	14.5%
Metals	Steel	1.79E-01	12.2%
Plastics	PA 6.6 GF30%	1.64E-01	11.1%
Plastics	Phenolic resin	1.53E-01	10.4%
Others	Formaldehyde	1.02E-01	6.9%
Others	Plain wood	5.38E-02	3.7%
Plastics	Polybuthylene terephthalate (PBT)	4.13E-02	2.8%
Plastics	PA 6 GF 30%	3.01E-02	2.0%
Metals	Iron	2.92E-02	2.0%
Metals	Stainless steel	2.91E-02	2.0%
Others	Glass fiber	1.82E-02	1.2%
Metals	Nickel	9.24E-03	0.6%
Metals	Brass	7.79E-03	0.5%
Others	Quartz sand	2.36E-03	0.2%
Other	Miscellaneous	8.12E-03	0.6%
	Total	1.47E+00	100.0%

Substance Assessment
The representative product is compliant with the EU-RoHS Directive (2011/65/EU) without exemption, and the product doesn't contain any Substance-of-Very-High-Concern (SVHC) on the Candidate List of the EU-REACH Regulation (1907/2006/EC).

Additional Environmental Information	
Manufacturing	The reference product is assembled at an Eaton plant holding management system certifications according to ISO 14001 standards.
Distribution	Eaton is committed to minimizing weight and volume of product and packaging with focus to optimize transport efficiency.
Installation	During installation of the product only standard tools are needed, which do not require any additional energy source and no waste other than the obsolete product packaging is generated during this step.
Use	The product does not have maintenance during operation.
End of life	The recyclability rate of the overall product is 44.7% if it is properly dismantled prior to shredding. The rate is calculated based on method described in IEC/TR 62635, Edition 1.0/2012-10 Guidelines for end-of-life information provided by manufacturers and recyclers and for recyclability rate calculation of electrical and electronic equipment.).

Environmental Impacts	
The calculation of the environmental impacts is the result of the Product's Life Cycle Analysis in accordance with ISO 14040/44, covering the entire lifecycle, i.e., "Cradle-to-Grave" including the following life cycle phases: production, distribution, installation, use and end of life. System modelling was carried out using the commercial LCA software EIME v6.3.2 with database version CODDE-2025-04. Indicators Set used: PEF EF 3.1 (Compliance: PEP ed.4, EN15804+A2) v1.0	
Manufacturing Phase	The product is assembled as well as packed at Eaton Bussmann plant Gummers Bach, Germany Energy model used: Germany
Distribution Phase	Distribution of the product in its packaging from Eaton's last logistics platform to the installation place in Europe is considered as per PCR rules.
Installation Phase	Only treatment of packaging waste is considered in this phase. Energy model used for treatment of packaging: Germany
Use Phase	PSR Product Category: Other Equipment (Scenario: Passive product - Non-Continuous Operation) Reference lifetime: 20 Years Energy model used: Germany Usage profile: The product has 150 A rated current and Heat dissipation of 25.5 W, Resulting in total losses of 120.63 kWh over 20 years. Products do not require any maintenance/replacement during useful life.
End of life Phase	Product disposed of with WEEE guidelines. Energy model used: Europe

Environmental Impact Indicators: Mandatory

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use(B1-B7) B6 Only*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Climate change – total (GWP)	kg CO_2 eq.	6.24E+01	5.66E+00	9.44E-02	7.45E-01	5.51E+01	8.02E-01	-1.31E+00
Climate change - fossil fuels (GWP-f)	kg CO_2 eq.	6.09E+01	5.89E+00	9.44E-02	3.13E-01	5.38E+01	7.94E-01	-1.53E+00
Climate change – biogenics (GWP-b)	kg CO_2 eq.	1.49E+00	-2.28E-01	3.86E-07	4.32E-01	1.27E+00	8.10E-03	2.19E-01
Climate change - land use and land use transformation (GWP-lu)	kg CO_2 eq.	8.22E-07	4.24E-07	1.43E-07	3.81E-09	0.00E+00	2.51E-07	0.00E+00
Ozone depletion (ODP)	kg eq. CFC-11	1.12E-06	7.57E-07	1.15E-09	3.69E-09	3.13E-07	4.53E-08	-3.03E-07
Acidification (AP)	mole of H^+ eq.	5.33E-01	1.32E-01	1.49E-04	7.75E-04	3.95E-01	4.66E-03	-4.82E-02
Freshwater eutrophication (EP-fw)	kg P eq.	9.38E-05	4.73E-05	3.53E-07	3.38E-06	3.72E-05	5.57E-06	-5.50E-06
Marine aquatic eutrophication (EP-m)	kg of N eq.	4.79E-02	4.74E-03	2.70E-05	3.48E-04	4.20E-02	7.38E-04	-1.46E-03

Mandatory environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use(B1-B7) B6 Only*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Terrestrial eutrophication (EP-t)	mole of N eq.	7.16E-01	5.39E-02	2.97E-04	2.37E-03	6.50E-01	9.38E-03	-1.58E-02
Photochemical ozone formation (POCP)	kg of NMVOC eq.	1.63E-01	2.46E-02	9.59E-05	5.61E-04	1.35E-01	2.36E-03	-7.44E-03
Depletion of abiotic resources – elements (ADPe)	kg eq. Sb	1.19E-03	1.17E-03	3.37E-08	1.35E-08	1.86E-05	1.39E-07	-6.80E-04
Depletion of abiotic resources - fossil fuels (ADP-f)	MJ	1.13E+03	1.47E+02	1.68E+00	2.54E+00	9.70E+02	1.39E+01	-2.83E+01
Water scarcity (WDP)	m^3 of eq..	1.19E+01	6.67E+00	3.40E-03	2.07E-02	5.11E+00	1.30E-01	-2.46E+00

***Note:** B6 (energy requirements during the use stage) is considered. Other sub modules in the use stage (B1-B5, B7) are equal to zero. So, it is not listed in the result tables.

Inventory Flow Indicators: Mandatory

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use(B1-B7) B6 Only*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ	3.09E+02	7.03E+00	5.29E-03	5.80E-01	3.00E+02	1.06E+00	-5.34E-01
Use of renewable primary energy resources used as raw materials	MJ	4.86E+00	4.86E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.47E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	3.13E+02	1.19E+01	5.29E-03	5.80E-01	3.00E+02	1.06E+00	-4.00E+00
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials	MJ	1.12E+03	1.33E+02	1.68E+00	2.54E+00	9.70E+02	1.39E+01	-2.83E+01
Use of non-renewable primary energy resources used as raw materials	MJ	1.45E+01	1.45E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.78E-03
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	1.13E+03	1.47E+02	1.68E+00	2.54E+00	9.70E+02	1.39E+01	-2.83E+01
Use of secondary materials	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net use of fresh water	m^3	2.80E-01	1.56E-01	7.91E-05	1.57E-03	1.19E-01	3.79E-03	-5.73E-02
Hazardous waste disposed of	kg	8.34E+01	7.97E+01	3.95E-04	2.03E-02	2.15E+00	1.46E+00	-4.81E+01
Non-hazardous waste disposed of	kg	1.18E+01	1.68E+00	8.76E-03	1.10E-01	9.29E+00	7.46E-01	-7.20E-01
Radioactive waste disposed of	kg	1.41E-03	3.19E-04	6.94E-06	1.65E-05	1.01E-03	5.39E-05	-3.43E-04

Inventory flow indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use(B1-B7) B6 Only*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	8.38E-01	1.84E-01	0.00E+00	1.92E-01	0.00E+00	4.62E-01	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ by energy vector	1.78E-02	0.00E+00	0.00E+00	1.78E-02	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content of the product	kg of C.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Biogenic carbon content of the associated packaging	kg of C.	1.13E-01	1.13E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

***Note:** B6 (energy requirements during the use stage) is considered. Other sub modules in the use stage (B1-B5, B7) are equal to zero. So, it is not listed in the result tables.

Environmental Impact Indicators: Optional

Optional Environmental impact indicators	Units	Sum	A1-A3 - Manufacturing	A4 - Distribution	A5 - Installation	Use(B1-B7) B6 Only*	C1-C4 - End of life	D - Benefits and loads beyond the system boundaries
Emission of fine particles	incidence of diseases	3.24E-06	8.45E-07	1.28E-09	4.57E-09	2.36E-06	3.04E-08	-6.14E-07
Ionizing radiation, human health	kBq of U^{235} eq.	2.65E+01	5.36E+00	3.34E-03	3.50E-02	2.08E+01	2.71E-01	-9.03E-01
Ecotoxicity, fresh water	CTUe	2.65E+03	2.51E+03	2.75E+00	3.75E+00	1.21E+02	1.30E+01	-1.70E+01
Human toxicity, cancer effects	CTUh	4.99E-07	4.66E-07	1.85E-11	2.56E-08	7.60E-09	2.23E-10	-2.31E-06
Human toxicity, non-cancer effects	CTUh	1.83E-06	1.57E-06	3.53E-10	8.21E-10	2.48E-07	8.34E-09	-6.18E-07
Impacts related to land use/soil quality	-	1.16E+00	2.69E-02	4.04E-04	8.84E-04	1.12E+00	1.54E-02	-1.43E-04
Total use of primary energy during the life cycle	MJ	1.45E+03	1.59E+02	1.68E+00	3.12E+00	1.27E+03	1.50E+01	-3.23E+01

***Note:** B6 (energy requirements during the use stage) is considered. Other sub modules in the use stage (B1-B5, B7) are equal to zero. So, it is not listed in the result tables.

To evaluate the environmental impact of other products covered by this PEP, multiply the impact figures by

Multiplying factors for homogeneous family products:

Product Number	Product Number	Phases	GWP (kg CO_2 eq.)	GWP-f (kg CO_2 eq.)	GWP-b (kg CO_2 eq.)	GWP-lu (kg CO_2 eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
278466 (Reference)	ZB150-150	Manufacturing	1												
		Distribution	1												

Product Number	Product Number	Phases	GWP (kg CO_2 eq.)	GWP-f (kg CO_2 eq.)	GWP-b (kg CO_2 eq.)	GWP-lu (kg CO_2 eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
		Installation	1												
		End of life	1												
		Module-D	1												
107316	ZB150-175	Manufacturing	1												
		Distribution	1												
		Installation	1												
		End of life	1												
		Module-D	1												
278461	ZB150-35	Manufacturing	1												
		Distribution	1												
		Installation	1												
		End of life	1												
		Module-D	1												
278462	ZB150-50	Manufacturing	1												
		Distribution	1												
		Installation	1												
		End of life	1												
		Module-D	1												
278463	ZB150-70	Manufacturing	1												
		Distribution	1												
		Installation	1												
		End of life	1												
		Module-D	1												
278464	ZB150-100	Manufacturing	1												
		Distribution	1												
		Installation	1												
		End of life	1												
		Module-D	1												
278465	ZB150-125	Manufacturing	1												
		Distribution	1												
		Installation	1												
		End of life	1												
		Module-D	1												
107317	ZB150-175/KK	Manufacturing	1.2	1.2	1.3	1.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.4	1.0
		Distribution	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Installation	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		End of life	1.3	1.3	1.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3
		Module-D	1.4	1.4	1.2	1.0	1.3	1.0	1.3	1.3	1.3	1.2	1.2	1.5	1.1
278467	ZB150-35/KK	Manufacturing	1.2	1.2	1.3	1.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.4	1.0
		Distribution	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Installation	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		End of life	1.3	1.3	1.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3
		Module-D	1.4	1.4	1.2	1.0	1.3	1.0	1.3	1.3	1.3	1.2	1.2	1.5	1.1
278468	ZB150-50/KK	Manufacturing	1.2	1.2	1.3	1.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.4	1.0
		Distribution	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Installation	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		End of life	1.3	1.3	1.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3
		Module-D	1.4	1.4	1.2	1.0	1.3	1.0	1.3	1.3	1.3	1.2	1.2	1.5	1.1
278469	ZB150-70/KK	Manufacturing	1.2	1.2	1.3	1.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.4	1.0
		Distribution	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Installation	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		End of life	1.3	1.3	1.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3
		Module-D	1.4	1.4	1.2	1.0	1.3	1.0	1.3	1.3	1.3	1.2	1.2	1.5	1.1
278470	ZB150-100/KK	Manufacturing	1.2	1.2	1.3	1.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.4	1.0

Product Number	Product Number	Phases	GWP (kg CO_2 eq.)	GWP-f (kg CO_2 eq.)	GWP-b (kg CO_2 eq.)	GWP-lu (kg CO_2 eq.)	ODP (kg CFC-11 eq.)	AP (mol H+ eq.)	EP-fw (kg P eq.)	EP-m (kg N eq.)	EP-t (mol N eq.)	POCP (kg NMVOC eq.)	ADP-e (kg Sb eq.)	ADP-f (MJ)	WDP (m3 eq.)
		Distribution	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Installation	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		End of life	1.3	1.3	1.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3
		Module-D	1.4	1.4	1.2	1.0	1.3	1.0	1.3	1.3	1.3	1.2	1.2	1.5	1.1
278471	ZB150-125/KK	Manufacturing	1.2	1.2	1.3	1.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.4	1.0
		Distribution	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Installation	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		End of life	1.3	1.3	1.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3
		Module-D	1.4	1.4	1.2	1.0	1.3	1.0	1.3	1.3	1.3	1.2	1.2	1.5	1.1
278472	ZB150-150/KK	Manufacturing	1.2	1.2	1.3	1.0	1.1	1.0	1.2	1.1	1.1	1.1	1.0	1.4	1.0
		Distribution	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
		Installation	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
		End of life	1.3	1.3	1.1	1.3	1.3	1.3	1.1	1.2	1.2	1.2	1.2	1.3	1.3
		Module-D	1.4	1.4	1.2	1.0	1.3	1.0	1.3	1.3	1.3	1.2	1.2	1.5	1.1

Multiplying Factors for Use Phase for homogenous products:

Product Number	Product Number	Use Phases Extrapolation
278466 (Reference)	ZB150-150	1.00
107316	ZB150-175	1.35
278461	ZB150-35	0.82
278462	ZB150-50	0.85
278463	ZB150-70	0.85
278464	ZB150-100	0.99
278465	ZB150-125	1.04
107317	ZB150-175/KK	1.35
278467	ZB150-35/KK	0.82
278468	ZB150-50/KK	0.85
278469	ZB150-70/KK	0.85
278470	ZB150-100/KK	0.99
278471	ZB150-125/KK	1.04
278472	ZB150-150/KK	1.00

Disclaimer

This Product Environmental Profile and its content is based on information available to us. It refers to the product at the date of issue. We make no express or implied representations or warranties with respect to the information contained herein.

Registration number:	EATO-00460-V01.01-EN	*Drafting rules*	PCR-ed4-EN-2021 09 06
Verifier accreditation number:	VH56	Supplemented by	PSR-0005-ed3.1-EN-2023 12 08
Date of issue	10-2025	*Information and reference documents*	www.pep-ecopassport.org
		Validity period	5 years
Independent verification of the declaration and data, in compliance with ISO 14025: 2006			
Internal	X	External	
The PCR review was conducted by a panel of experts chaired by Julie ORGELET (DDemain)			
PEPs are compliant with XP C08-100-1:2016 and EN 50693:2019 *The components of the present PEP may not be compared with components from any other program.*			
Document complies with ISO 14025:2006 "Environmental labels and declarations. Type III environmental declarations"			